

### **REMARKS**

The Office Action notes claims 55, 57-78, 80-85, 87-90, 92-94 and 99-106 are pending in the application. Claim 101 is hereby cancelled in the instant response and claims 107-148 are added. Proper support for new independent claims 132 and 142 can be found at page 47, line 23 to page 48, line 2 and page 73, lines 4-14 of the specification. Accordingly, it is submitted that no new matter has been added by the way of any amendment(s) presented.

It is noted with appreciation that claims 66-78 and 105 have been allowed and claims 99, 100, 103, 104 and 106 have been indicated to contain allowable subject matter. The Examiner objected to claims 99, 100, 103, 104 and 106 as being dependent on a rejected base claim. Applicants have corrected this in the amended claims submitted herewith to overcome the objectionable matter of the aforesaid base claims. Applicants believe that the submitted claims fulfill the statutory requirements for patentability and submit that no further correction is needed.

On page 2 of the Office Action, the Examiner rejected claims 80-85, 87-90 and 92-94 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 80-85, 87-90 and 92-94 has been amended in order to overcome the indefiniteness objection by positively reciting the limitations of the claimed resin composition to provide a set of claims which are submitted to be allowable as meeting the statutory requirements of patentability. Accordingly, the claims are in condition for allowance.

#### **Rejections Under 35 U.S.C. §102(b)/103(a)**

Claims 55, 57-65, 101 and 102 stand rejected under 35 U.S.C. §102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. §103(a) as being unpatentable by Scheve et al., U.S. Patent No. 4,717,643.

In presenting the rejection, the Examiner states that Scheve et al. “teaches a hardenable resin composition comprising a polymer prepared from acrylate monomers including acrylic acid and a hydroxy acrylate that is reacted with isocyanatoethyl methacrylate in the presence of triphenyl phosphite stabilizer and further reacted with hydroxylpropyl methacrylate. See examples 1 and 3-5. The hydroxylpropyl methacrylate inherently reacts with any acid anhydride side product to produce an ester bond.”

In response, as has been previously explained by Applicants, the polymer disclosed in Scheve et al. contains a large quantity of an acid anhydride group and is less stable when compared to the highly stable polymer of the present invention.

A highly stable polymer as claimed in the present invention is obtained in a synthesizing process “by reacting a polymer with an isocyanate compound until the isocyanate group, as measured by an IR absorption spectrum at a peak of  $2,200\text{ cm}^{-1}$  is no longer present, and then reacting the same with an alcohol.” Scheve et al. does not teach or disclose such a process. In particular, Scheve et al. describes that an excessive amount of isocyanate compound (IEM) is used in connection with the backbone polymer. Thus, since the excessive amount of IEM is added and reacted with respect to the backbone polymer, an acid anhydride group is formed on the principal chain of a polymer in large quantity.

Furthermore, where an excessive amount of IEM is used, such as in Scheve et al., IEM resides in the reaction system. Scheve et al. removes a residual IEA in a reaction system by HPMA (a compound having a hydroxyl group). Since in Scheve et al., HPMA is mainly consumed in order to remove the residual IEA, the acid anhydride group produced on the principal chain of the polymer is not decomposed, or the decomposition is not efficient even if the acid anhydride group is decomposed.

Additionally, a highly stable polymer of the present invention is obtained in a synthesizing process that includes reacting an intermediate product which is preliminarily reacted with an isocyanate compound with 10 to 120 parts by weight of an alcohol with respect to 100 parts by weight of the intermediate product. Contrary to the present invention, Scheve et al. uses a lesser amount of an alcohol (a compound having a hydroxyl group). The amounts of HPMA or other alcohols used in Scheve et al. can be seen in Examples 1-4 (of Scheve et al.).

In Example 1 of Scheve et al., the amounts of acrylate monomer, IEM and HPMA used are:

- 80 parts by weight of polypropyleneglycol monomethacrylate;
- 80 parts by weight of methacrylic acid;
- 140 parts by weight of methyl methacrylate;
- 100 parts by weight of ethyl acrylate;
- 33.5 parts by weight of IEM; and
- 10 parts by weight of HPMA

Provided that the total amount of each acrylate monomer and IEM is the amount of the intermediate product, the amount of the intermediate product is 433.5 parts per weight. The amount of HPMA, (a) below, with respect to 100 parts by weight of the intermediate product is as follows:

$$10:433.5 = (a):100$$

$$(a) = 1000/433.5 = 2.3 \text{ parts by weight}$$

In Example 2 of Scheve et al., the amounts of acrylate monomer and IEM used are:

- 32 parts by weight of polypropyleneglycol monomethacrylate;
- 136 parts by weight of ethyl acrylate;
- 3.2 parts by weight of lauryl methacrylate;

- 100 parts by weight of butyl methacrylate; and
- 11 parts by weight of IEM

In this example, 3.9 parts by weight of pentaerythritol tetraacrylate and 3.9 parts by weight of trimethylolpropane triacrylate were added to 90% of the intermediate product synthesized according to the above formulation. Therefore, the amount of alcohol with respect to 100 parts by weight of the intermediate product is as follows:

$$(3.9 + 3.9):(136 + 3.2 + 100 + 11) \times 0.9 = \text{alcohol}:100$$

$$\text{alcohol} = 780/225.1 = 3.5 \text{ parts by weight}$$

In Example 3 of Scheve et al., the amounts of acrylate monomer, IEM and HPMA used are:

- 20 parts by weight of polypropyleneglycol monomethacrylate;
- 20 parts by weight of lauryl methacrylate;
- 20 parts by weight of methacrylic acid;
- 30 parts by weight of methyl methacrylate;
- X parts by weight of IEM (amount not mentioned); and
- 10 parts by weight of HPMA

In Example 3 of Scheve et al., the amount of HPMA, (a), can be assumed to be 10 parts by weight (at most) with respect to 100 parts by weight of the intermediate product. Thus:

$$10:(20 + 20 + 20 + 30 + X) = (a):100$$

$$(a) = 1000/(90 + X)$$

In Example 4 of Scheve et al., the amounts of acrylate monomer, IEM and HPMA used are:

- 30 parts by weight of polypropyleneglycol monomethacrylate;
- 20 parts by weight of methacrylic acid;

- 40 parts by weight of methyl methacrylate;
- 22 parts by weight of IEM; and
- 10 parts by weight of HPMA

The amount of HPMA, (a) below, with respect to 100 parts by weight of the intermediate product is as follows:

$$10:(30 + 20 + 40 + 22) = (a):100$$

$$(a) = 1000/112 = 8.9 \text{ parts by weight}$$

As detailed above, the process of Scheve et al. uses an excessive amount of IEM.

Furthermore, a small amount of alcohol is used. Hence, HPMA is mainly consumed in order to remove the residual IEM in the reaction system so that the acid anhydride group produced on the principal chain of the polymer is not decomposed at all, or the decomposition is not efficient even if the acid anhydride group is decomposed. As a result the polymer disclosed in Scheve et al. contains an acid anhydride group in large quantity, and is inferior in stability when compared to the highly stable polymer of the present invention.

Thus, as described herein, the polymer disclosed in Scheve et al. is clearly distinct from the highly stable polymer of the present invention.

Additionally, allowable claims 99 and 100 have been amended to incorporate therein the subject matter of claim 55. Claims 99 and 100 are, therefore, independent forms of original claim 55 and are submitted to be, *prima facie*, in condition for allowance. Similarly, allowable claim 103 has been amended to incorporate therein the subject matter of base claim 101, which has been cancelled. Claim 103 is, therefore, an independent form of original claim 101 and is also submitted to be, *prima facie*, in condition for allowance. Allowable claim 104 has also been amended to incorporate therein the subject matter of claim 101, which, as stated above, has been cancelled. Claim 104 is, therefore, also believed to be in condition for allowance.

The claims 102 and 107-115 are dependent directly on either claims 99 or 103. Since dependent claims include all the limitations of their base claims and any intervening claims, Applicants respectfully submit that the dependent claims 102 and 107-115 and should be deemed allowable for the same reasons given with respect to claims 99 and 103 and respectfully request the early issuance of the Notice of Allowance.

Thus, Applicants respectfully request reconsideration and withdrawal of the § 102 and 103 rejections as to these claims.

### Conclusion

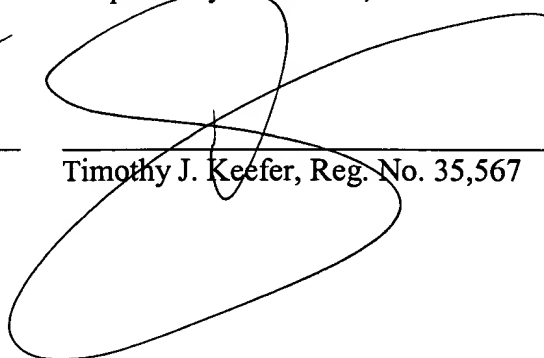
In view of the foregoing, it is submitted that, as amended, each of the remaining claims 55, 57-78, 80-85, 87-90, 92-94, 99, 100 and 102-148 are now in condition for allowance and the allowance thereof is respectfully requested. The Notice of Allowance is respectfully requested to be issued.

Should any further minor objections arise or need to be attended to, the Examiner is invited to contact the undersigned attorney to discuss the matters in an effort to successfully complete the prosecution of this application.

Date: \_\_\_\_\_

5/23/05

Respectfully Submitted,



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